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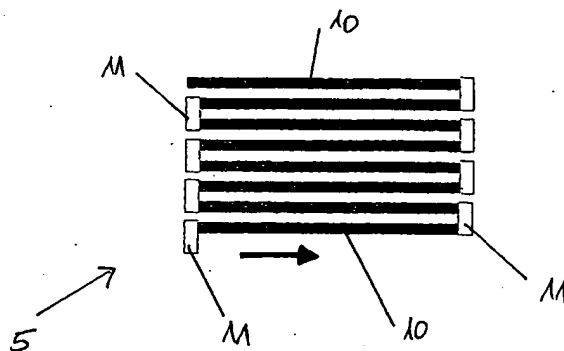
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(54) Title: MAGNETORESISTIVE SENSOR ELEMENT AND METHOD FOR REDUCING THE ANGULAR ERROR OF A
MAGNETORESISTIVE SENSOR ELEMENT

(54) Bezeichnung: MAGNETORESISTIVES SENSORELEMENT UND VERFAHREN ZUR REDUKTION DES WINKELFEH-
LERS EINES MAGNETORESISTIVEN



(57) **Abstract:** The invention relates to a magnetoresistive sensor element (5) comprising a magnetoresistive system of layers (10), which is constructed according to the spin valve principle and operates on the basis of the GMR effect, at least some sections of said system being strip-shaped when viewed from above. Said strip-shaped system of layers (10) comprises a reference layer (35) with a magnetisation direction that remains practically unaffected by the direction of an external magnetic field acting on said system. During operation, the sensor element (5) provides a measuring signal, which, as a function of a measuring angle, fluctuates between the component of the field strength of the external magnetic field, said component lying on the plane of the system of layers (10), and the magnetisation direction, whereby the measuring angle can be determined from said signal. In addition, when the strip-shaped system of layers (10) is viewed from above, the angle formed by the magnetisation direction, in the absence of the external magnetic field, and the longitudinal direction of the strip-shaped system of layers (10) is adjusted in such a way that when the external magnetic field is acting with a defined field strength, selected from a predetermined working interval, the angular error of the system of layers (10) is practically minimal, as a function of said angle and the field strength. The invention also relates to a method for reducing the angular error of a magnetoresistive sensor element (5).

[Fortsetzung auf der nächsten Seite]

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Abstract

A magnetoresistive sensor element (5) is provided, having a magnetoresistive layer system (10) which, in top view, is at least regionally striated, operates on the basis of the GMR effect and is constructed according to the spin valve principle, the striated layer system (10) featuring a reference layer (35) having a direction of magnetization approximately uninfluenced by a direction of an outer magnetic field acting on it. During operation, the sensor element (5) provides a measuring signal which changes as a function of a measurement angle between the component of the field strength of the outer magnetic field lying in the plane of the layer system (10), and the direction of magnetization, and from which this measurement angle is able to be ascertained. In addition, observed in a top view of the striated layer system (10), the angle between the direction of magnetization in the absence of the outer magnetic field and the longitudinal direction of the striated layer system (10) is set in such a way that in response to an influence of the outer magnetic field having a defined field strength, which is selected from a predefined work interval, the angle error of the layer system (10), as a function of this angle and the field strength, is at least approximately minimal. Moreover, a method is provided for reducing the angle error of a magnetoresistive sensor element (5).

Figure 3